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EFFECTS OF BASEL EQUITY AND LIQUIDITY REGULATIONS ON BANKING SECTOR FAILURE RISK IN EMERGING ASIAN ECONOMIES

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ABSTRACT

We study the effect of Basel equity requirements and liquidity creation measures on banking sector failure risk in the case of emerging Asian economies for 2004-2017 by using dynamic panel GMM methodology. This study's results show that a rise in equity requirements is likely to decrease in failure risk (as the higher z-score implies the reduced failure risk). The finding suggests that by an incremental increase in equity ratio, liquidity creation results in a rise in bank default risk. The finding is consistent with the argument that the liquidity generation function exposes the banking industry towards the risk of illiquidity. The findings also suggest the positive relationship amid bank capital structure and z-score, which implies a surge of equity in bank capital structure is likely to reduce the failure risk.

Disciplinary: Management, and Financial Sciences.

1. INTRODUCTION

The modern financial intermediation theory states that financial institutions undertake two basic functions in the economy i.e. to create liquidity in the system and do risk transformation. They generate liquidity by funding long-term, less liquid investments through short-term, liquid obligations. Hence, banks deliver money to the rest of the economic units by holding illiquid assets and face the risk of calling out of short-term liabilities invested in long-term assets. The recent subprime financial crisis demonstrates well how rapidly illiquidity in the system can prevail and sustain. Particularly, it indicates how various funding sources can dissolve and shows compounding concerns regarding assets valuation and regulatory capital requirements (BIS, 2009). Banks also provide liquidity to their customers through off-balance-sheet undertakings, like loaning commitments and letters of credits (Holmstrom & Tirole, 1998; Thakor, 2005; Kashyap et al 2002).

Bank role as a liquidity creator is risky as it holds illiquid investments when provides funding to external bodies. Liquidity creation enhances financial institute's exposure towards risk and

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increases the probability and intensity of losses related to the disposal of illiquid investments to fulfill the customers' liquidity needs (Allen & Gale, 2004; Allen & Santomero, 1997). The increase in cumulative liquidity demands, in dire situations, may end in a run on banks by investors (Diamond & Dybvig, 1983). Present academic literature shows that a rise of liquidity generation in the system results in increased illiquidity in the banking sector that may be considered as a key reason for financial fragility (Berger & Bouwman, 2017; Thakor, 2005). The current study is complementary to the earlier literature, investigating how the bank capital contributes to liquidity risk-sharing by effecting the association amid bank failure risk and liquidity generation at bank-level data.

The role of regulatory capital is also important as it affects the bank risk-taking activities, which ultimately impact the liquidity creation in the system. The literature observing the association between risk-taking and bank equity has mixed results. One side of the literature reveals a positive relation amid risk-taking and bank equity implying that banks with high equity ratios are encouraged by supervisory bodies to take on more risk known as *"regulatory hypothesis*" (Altunbas et al., 2007; Ugwuanyi, 2015). On the other side, the "*moral hazard hypothesis"* predicts the negative association amid bank equity and risk, when banks benefit from deposit insurance arrangements (Agoraki et al., 2011; Lee & Chih, 2013; Lee & Hsieh, 2013; Rahman et al., 2018). The "moral hazard hypothesis" is especially important in case when risk and leverage positions in the banking sector are previously higher. The literature also reveals bi-directional causality amid bank equity and risk-taking.

The present academic literature reveals the causal linkage that moves from bank equity to liquidity generation and it presents two opposite observations regarding the relationship. Berger & Bouwman (2009) discuss, in the first argument, bank equity is inclined to hinder liquidity formation by two divergent views: the "financial-fragility structure" and "crowding-out of deposits" arguments. Under "financial-fragility structure", higher equity is linked with reduced monitoring leading to lesser creation of liquidity (Diamond & Rajan, 2000, 2001), whereas the high equity ratios might crowd-out the deposits and hence lessen liquidity generation (Gorton & Winton, 2000). In the second observation, higher equity improves the capability of financial institutes to further generate the liquidity as equity permits to absorb more risk that validates the "risk-absorption hypothesis" (Von Thadden, 2004; Bhattacharya & Thakor, 1993).

The current study contributes to prior studies in several ways. Firstly, we take the two measures of liquidity generation, one is Berger & Bouwman's liquidity generation measure and the other is the "net-stable-funding ratio" measure suggested by the "Basel Committee on banking supervision" (BCBS). Second, we examine the impact of both the Basel equity requirements and liquidity formation measures on bank failure risk in the case of emerging Asian markets. Third, we also examine the indirect impact of liquidity formation, through its interaction with a change in equity ratios, on banking sector failure risk. Fourth, the current study focuses on the Asian emerging economies, as the Basel III is presented in the reaction of the 2007 global economic crunch that largely hits the western developed nations. But the Basel regulatory reforms are not only meant to tackle the reasons behind the crisis but also to synchronize the regulations worldwide.

The study results reveal a positive association amid bank equity ratios and z-score, which implies that a rise in equity is likely to decrease in banking failure risk. The result validates the

point that bank equity functions as a remedy against future losses and reduces the prospect of failure risk in banks. The findings propose that with an incremental rise in bank equity ratio, the influence of liquidity generation on z-score is negative, which implies the increase in bank default risk.

2. LITERATURE REVIEW

This study discusses the role of liquidity generation in effecting banking sector failure risk and also examines the moderating role of regulatory equity requirements in influencing the association amid liquidity generation and banking failure risk.

2.1 LIQUIDITY CREATION AND BANK EQUITY REQUIREMENTS

The relation amid liquidity generation and bank capital can be explained based on two types of hypotheses i.e. "financial fragility/ crowding-out of deposits" and "risk-absorption hypothesis". The "financial fragility/ crowding-out" theory predicts an inverse association amid bank equity and the formation of liquidity. The financial-fragility theory states that higher equity ratios make financial institutes less financially fragile leading to a reduction in depositor's monitoring activity and hinder the role of banks as liquidity creators (Diamond & Rajan, 2000, 2001). The second view i.e. crowding-out theory predicts that high equity ratios may crowd-out the deposits, leading to a reduction in funds available for bank liquidity generation (Gorton & Winton, 2017). The second proposition i.e. "risk-absorption hypothesis" states there exists positive relation amid bank equity and liquidity creation as the higher equity ratios reduce the risks of illiquidity related to bank liquidity formation and improve the risk absorbing capability of banks (Allen & Gale, 2004; Von Thadden, 2004).

By using a dataset of the US banking sector for 1993-2003, Berger and Bowman (2009) explore the association between bank equity and liquidity generation. The findings of the study support both hypotheses. The "financial fragility" hypothesis is proved in small size banks, but in the case of big banks, the "risk-absorption" hypothesis holds. There also exist several studies that investigate the bi-directional relationship amid bank equity and liquidity generation. For instance, Horvath et al. (2014) examine the association between bank equity and liquidity generation by employing Czech banking sector data for 2000-2010. The study findings show that bank equity negatively impacts liquidity generation and liquidity generation also granger causes a reduction in bank equity. Casu et al. (2018) investigate the relationship amid Basel equity requirements and liquidity generation by employing a European countries' sample for 1999-2013. The findings of the study show a bi-directional negative causality implying that liquidity generation is reduced when bank equity is increased, and bank capital is reduced when liquidity is generated. Le (2018) investigate the relationship amid bank equity and liquidity generation in the Vietnam banking industry for 2007-2015. The study findings imply a bi-directional negative relationship amid bank equity and liquidity generation. Tran et al. (2016) examine the link amid the bank's equity requirements, liquidity generation, and profitability in the case of the US banking sector. The study findings reveal a bi-directional positive relation amid bank equity and liquidity generation by controlling the effect of profitability and the finding is significant in the case of small size banks and during periods of non-crisis. Umar et al. (2017) study the effect of bank equity on liquidity

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generation by using Indian banks' data from 2000 to 2014. The study findings reveal that the "financial fragility/crowding-out" theory holds in the instance of a narrow liquidity measure, whereas the "risk-absorption" theory is proved significant in the case of broad liquidity measures in listed banks before crisis period.

2.2 EQUITY REQUIREMENTS AND BANK FAILURE RISK

The role of regulatory equity in effecting bank failure risk is based on several sets of theories. On one side, it is argued that bank equity functions as a remedy against future losses and reduces the prospect of bank failure risk (Von Thadden, 2004). The other side focuses the incentives effect of bank equity, in which equity either induces the better monitoring of borrowers which leads to a reduction in default probability (Holmstrom & Tirole, 1998) or it lessens the risk-taking enticements in banking sector (Acharya et al., 2016). On the whole, the above theories suggest an inverse association amid bank equity and failure risk. Recent studies examining the factors of bank failure risk reveal bank equity as an essential factor of failure risk especially during the recent 2007 global crisis (Beltratti & Stulz, 2012; Cole & White, 2012). Especially, banks with high equity ratios have more prospects to react against these shocks and have little failure risk.

2.3 BANK FAILURE RISK AND LIQUIDITY CREATION

There exist many views regarding the relationship between bank failure risk and liquidity generation. Liquidity is generated by financing long-term, illiquid investments with liquid short-term obligations. Hence, liquidity generation function exposes the banking industry towards the risk of illiquidity i.e. the disposal of premature illiquid investments to cope client's liquidity needs in case of sudden withdrawals by depositors and use of a line of credit facilities by borrowers (Diamond & Rajan, 2011). This side of the argument foresees that liquidity generation leads banks towards vulnerability. The other side of arguments predicts an inverse relationship amid liquidity generation and bank failure risk based on two arguments. According to the first argument, liquidity generation is the primary function of banks and it provides information about the banking institutions' ability to support the economy by providing funds to the rest of the economy through its risk transformation function. Hence, the failure of the banking system to perform its basic function of liquidity generation leads to the vulnerability of the economic system (Fungacova et al. 2015). Chatterjee (2018), in line with the same argument, shows that low liquidity generation leads to a downturn in the US. In the second argument, Berger et al. (2008) argue that financial institutes maintain their ratios of capital in line with future risk exposure. Particularly, banking institutions improve their equity ratios in reaction to the risk of bank illiquidity created by liquidity generation (Distinguin et al. 2013). From this perspective, liquidity generation is recognized as a risky activity and is inversely related to the failure risk of banks. Based on prior literature, we formulate the succeeding hypotheses:

H1: there exists a significant relationship between bank equity and failure risk.

H2: there exists a significant relationship between liquidity generation and failure risk.

H3: the association amid bank failure risk and liquidity generation is contingent on bank equity.

3. DATA AND VARIABLES

3.1 DATA

The present study examines the impact of equity requirements and liquidity creation measures on bank failure risk. The sample of study ranges from 2004 to 2017 and encompasses the emerging Asian economies that are included in both emerging markets indexes i.e. Financial Times Stock Exchange (FTSE) index and Morgan Stanley Capital Index (MSCI). The Basel III is introduced in response to the 2007 subprime mortgage crisis, but most of the prior literature on Basel regulatory requirements and financial crisis has focused the western economies with little emphasis on Asian economies. Hence, we study the effect of these Basel equities and liquidity reforms on banking sector failure risk in Asian economies. The selected sample comprises the seven emerging Asian economies including Pakistan, India, China, Indonesia, Philippines, Malaysia, and Thailand.

3.2 DESCRIPTION OF VARIABLES

The explained variable examined in the study is the failure risk of banks and is constructed by z-score that is extensively employed in prior literature to measure insolvency risk in the banking sector. The z-score is defined as by taking a fraction of the sum of "return-on-assets and equity-to-assets" ratios to the standard error of the return-on-assets. A high value of z-score characterizes the low-level bank failure and insolvency risks. As the literature indicates that the z-score values are extremely skewed, thus we use the z-scores natural logarithm as a construct of bank failure risk (Laeven & Levine, 2009).

In the case of independent variables, liquidity formation is defined as liquidity creation measure (LCM) given by Berger & Bouwman (2009) and given as

LCM = "(0.5 * illiquid assets + 0 * semiliquid assets - 0.5 * liquid assets+ 0.5 * liquid liabilities + 0 * semiliquid liabilities - 0.5 * illiquid liabilities) / Total Assets"

To calculate this measure, liabilities, and assets are first categorized as illiquid, semi-liquid and liquid, based on their maturity and type, then each item is weighted based on the above formula.

The second liquidity formation measure is based on Basel regulatory reforms proposed by BCBS because of severe disturbances in the financial system post the 2007 crisis period and known as "net-stable-funding ratio" (BIS, (2009). The higher measure of liquidity indicator represents high liquidity, as banks put more liquid obligations into less liquid investments. To confirm the Berger & Bouwman liquidity measure, we use the inverse of the Basel liquidity measure i.e. reciprocal of the "net-stable-funding ratio". The formula used to compute the second liquidity indicator is given as follows:

RNSFR = "Required amount of stable funding / Available amount of stable funding"

= "0 * (cash + interbank assets + short-term marketable assets) + 0.5 * (long-term marketable assets + customer acceptances) + 0.85 * consumer loans + 1 * (commercial loans + other loans + other assets + fixed assets) / 0.7 * (demand deposits + saving deposits) + 0 * (short-term market debt + other short-term liabilities) + 1 * (long-term liabilities + equity)"

The description of the remaining variables is given in Table 1.

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Table 1: Variables Definition

Classification	Variables	Description
Bank Failure Risk (BFR)	Z-score	Constructed by the natural log of Z-score
Liquidity Generation Indicators (LIQ)	Liquidity creation measure (LCM)	Given by Berger & Bouwman (2009)
	Reciprocal of net stable funding ratio (RNSFR)	Introduced by BCBS (BIS, 2009)
Capital (CAP)	Regulatory capital (CAP)	Tier 1 Capital ratio (T1R)
		Total Capital ratio (TCR)
Bank Specific Control Variables (BANK)	Profitability (ROE)	The ratio of Net income to total equity
	Bank Size (SIZE)	Measured by the natural log of total assets
	Price to book ratio (PBR)	Market (Price) value to book value ratio
	Bank capital structure (BCS)	The ratio of bank equity to total assets
Macroeconomic Variables (MACRO)	Inflation (INF)	Measured by the Consumer Price Index
	Economic Growth (GDP)	GDP growth rate
	Domestic credit to the private sector (DCPS)	Private Sector Domestic credit
	Monetary policy measure (MP)	The interest rate as given by a country's central bank as a policy rate between the banks and other financial institutions
Regulatory Pressure Variables (RP)	Bank Market Power (BMP)	The ratio of bank i total assets in country j to total banking system assets in country j

4. MODEL AND METHODOLOGY

The present study uses the Arellano & Bond (1991) panel data, a two-step dynamic GMM methodology, known as difference GMM and which uses the instruments in form of lags differences, to overcome the endogeneity issue.

The following set of equations is specified to study the influence of liquidity formation and equity requirements on banking sector failure risk in a dataset of emerging Asia economies during 2004-2017.

$$BFR_{it} = \beta_0 + \beta_1 BFR_{i\,t-1} + LIQ_{i\,t} + CAP_{i\,t} + \sum_{j=1}^{M} \beta_j BSV_{ji\;t} + \sum_{k=1}^{N} \beta_k MACROV_{ki\;t} + \lambda BMP_{i\,t} + v_{it} \quad (1)$$

The second model is specified to observe the effect of liquidity formation on banking sector failure risk depending on equity requirements. To check the effect of equity requirements, we take the tier one and total capital ratios as a measure of regulatory equity. We specify the equity ratios both in level form and also the change in capital ratios.

$$BFR_{it} = \beta_0 + \beta_1 BFR_{i\,t-1} + LIQ_{i\,t} + CAP_{i\,t} + LIQ_{i\,t} * CAP_{i\,t} + \sum_{j=1}^{M} \beta_j BSV_{ji\;t} + \sum_{k=1}^{N} \beta_k MACROV_{ki\;t} + \lambda BMP_{i\,t} + v_{it} \quad (2)$$

The bank-specific variable (BSV) are those which are derived from earlier literature and includes the bank size (SIZE), price to book ratio (PBR), profitability (ROE) and bank capital structure (BCS). The macroeconomic variables include economic growth (GDP), monitory policy measure (MP), inflation (INF) and domestic credit to private sector ratio (DCPS). The regulatory pressure measure incorporates the bank market power and a higher market power represents the low competition in the market.

5. DISCUSSION

The present study investigates the influence of liquidity generation and equity requirements on bank's failure risk by using a sample of emerging Asian economies for 2004-2017. The descriptive statistics are given in Table 2 and report the total observations, average values, standard errors, highest and lowest values of variables employed in this study. The average of the bank's failure risk (BFR) is 2.90 and the standard error of 1.21. The liquidity creation measure (LCM) has an average of 0.230 and a standard error of 1.58, while the average of the reciprocal of the "net-stable-funding ratio" is 0.648 with a standard error of 0.866. The tier one ratio has a mean of 0.131 with a standard error of 0.123, while the total capital proportion has a mean of 0.159. The bank-specific and macroeconomic variables also don't show large variations.

Table 2: Descriptive Statistics

Variable	# of Obs.	Average	SD	Minimum	Maximum
BFR	2124	2.90	1.21	-4.67	4.73
RNSFR	2137	0.648	0.866	-8.45	19.63
LCM	2137	0.230	1.58	-4.70	47.70
T1R	2137	0.131	0.123	-1.67	1.56
TCR	2137	0.159	0.122	-1.59	1.56
ROE	2137	0.126	0.232	-6.50	2.44
PBR	2137	1.93	6.38	-99.2	96.3
BCS	2137	0.096	0.085	-0.137	0.997
BMP	2137	0.327	0.529	0.00	3.92
SIZE	2137	13.4	2.26	3.97	20.8
GDP	2137	6.52	2.41	-1.51	14.2
MP	2137	8.78	3.10	4.33	16.0
INF	2137	5.23	3.46	-0.90	20.3
DCPS	2137	68.2	43.4	15.4	156.8

The regression model findings are given in Tables 3 and 4. The findings of the regression model show a positive relation amid bank equity ratios and z-score, which implies that a rise in equity measure is likely to decrease in banking sector failure risk (as the higher z-score implies the reduced failure risk). The findings are consistent with the Von Thadden (2004), arguing that bank equity functions as a remedial against future losses and reduces the prospect of bank failure risk. The findings also validate the incentives effect of bank equity, in which equity either induces the better monitoring of borrowers which leads to a reduction in default probability (Holmstrom & Tirole, 1998) or lessens the risk-taking enticements in banking sector (Acharya et al., 2016). However, when we make the change in equity ratio as a measure of capital requirements, it has a negative and insignificant relation with bank failure risk except in one case where it proves to be significant. The impact of liquidity generation, whether it is measured by Berger & Bouwman (2009) "liquidity creation measure" (LCM) or Basel accord III "net-stable-funding ratio" (RNSFR), on bank failure is not significant in any case.

The indirect impact of liquidity generation on banking failure risk, through its interaction with a change in equity ratios, is negative and significant in the case of both capital ratios (i.e. T1R and TCR). The findings propose that with incremental growth in the bank equity ratio, the impact of liquidity generation on z-score is negative, which implies a rise in bank default risk. The result

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validates the argument of Diamond & Rajan (2011), that liquidity generation function exposes banking industry towards the risk of illiquidity i.e. the disposal of premature illiquid investments to cope client's liquidity needs in case of sudden withdrawals by depositors and use of a line of credit facilities by borrowers. This side of argument foresees that liquidity generation leads banks towards vulnerability i.e. further the liquidity is generated, greater is the prospect of bank failures.

In the case of bank internal control variables, profitability and bank size, both impact bank failure risk measure i.e. z-score positively. The results imply that a rise in bank profitability is expected to improve the z-score which results in the reduction of bank failure risk. Also the bank size effects z-score positively that implies the reduction in bank failure risk. Bank capital structure is proxied by the "equity to assets ratio" and the result shows the positive effect of bank equity structure on z-score. The finding implies that a surge of equity in capital structure is likely to reduce bank failure risk. In the case of macroeconomic indicators, the interest rate (i.e. monitory policy indicator) has a significant negative impact on z-score, implying the higher bank failure risk. The result suggests that an increase in interest rates reduces the economic activity and hence increase the bank failure risk.

Table 3: Regression Model Results

Bank Failure Risk (BFR)	Model 1		Model 1		Model 1	
	Coef.	P Value	Coef.	P Value	Coef.	P Value
Cons.	1.737***	0.000	1.736***	0.000	2.644***	0.000
BFR(t-1)	0.031	0.662	0.028	0.692	0.047	0.530
CAP	2.444***	0.000	2.453***	0.000		
ΔCAP					-0.558***	0.003
LIQ	-0.003	0.684	0.011	0.571		
ROE	1.555***	0.000	1.553***	0.000	1.648***	0.000
PBR	-.001	0.826	-0.001	0.802	-0.001	0.867
SIZE	0.047**	0.028	0.047**	0.027	-0.017	0.629
BMP					0.138*	0.099
INF	0.096	0.544	0.096	0.545		
MP	-1.55*	0.056	-1.543*	0.056	-0.598	0.614
DCPS					0.212	0.137
AR1, AR2, (p value)	0.178	0.367	0.180	0.371	0.212	0.404
Wald chi2 (Prob)	41.93***	0.000	42.48***	0.000	46.37***	0.000
No. of banks	160				160	
No. of Obs.	1789				1789	

The level of significance i.e. 1%, 5% and 10% is represented by ***, ** and * respectively.

Table 3 shows the base model results. The explained variable is bank failure risk (BFR), liquidity formation is proxied by liquidity creation indicator in the first model and reciprocal of net-stable-funding ratio in the second model. Profitability (PROF) is given by return-on-equity and CAP represents the total capital ratio and ΔCAP represents the change in capital ratio. The Arellano & Bond autocorrelation test is employed to test the presence of serial correlation.

Table 4 shows the regression model 2 results. The explained variable is bank failure risk (BFR) and is measured by the natural log of z-score. Liquidity formation is proxied by liquidity creation indicator and reciprocal of net-stable-funding ratio. Capital (CAP) is measured by taking the change in T1R and TCR ratios, profitability (PROF) is given by return-on-equity (ROE). The Arellano &

Bond autocorrelation test is employed to test the presence of serial correlation.

Table 4: Regression Model Results

BFR	Model (LCM)		Model (RNSFR)		Model (LCM)		Model (RNSFR)	
	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
Const.	1.291***	0.000	1.381***	0.000	1.258***	0.000	1.373***	0.000
BFR(t-1)	0.014	0.803	0.012	0.844	0.013	0.820	0.012	0.842
ΔCAP (TCR)	-0.095	0.403	-0.011	0.940				
ΔCAP (TIR)					-0.088	0.464	-0.017	0.902
LIQ	0.010	0.473	0.006	0.506	0.005	0.665	0.006	0.475
ROE	1.634***	0.000	1.645***	0.000	1.638***	0.000	1.649***	0.000
BMP	-0.001	0.977	0.010	0.794	0.003	0.945	0.011	0.780
SIZE	0.064***	0.000	0.058***	0.001	0.066***	0.000	0.058***	0.000
BCS	5.885***	0.000	5.849***	0.000	5.900***	0.000	5.850***	0.000
GDP	0.044	0.819	0.052	0.802	0.070	0.717	0.050	0.812
MP	-0.534	0.493	-0.518	0.524	-0.557	0.534	-0.529	0.539
LIQ* ΔCAP (TCR)	-0.480**	0.040	-0.121	0.415				
LIQ* ΔCAP (T1R)					-0.598**	0.021	-0.106	0.436
AR1, AR2, (prob)	0.201	0.347	0.192	0.372	0.201	0.342	0.192	0.371
Wald chi(2) (Prob)	217.35***	0.000	144.30***	0.000	348.30***	0.000	160.83***	0.000
No. of banks	160		160		160		160	
No. of Obs.	1789		1789		1789		1789	

The level of significance i.e. 1%, 5% and 10% is represented by ***, ** and * respectively.

The robustness of the findings is tested in several ways. First, we construct the liquidity generation in two ways, i.e. “liquidity creation measure” suggested by Berger & Bouwman (2009) and “net-stable-funding ratio” given by BCBS (2009). Second, the regulatory equity ratio is measured by two proxies i.e. total capital and tier one capital ratios. However, the findings of the study prove the robustness of alternative measures.

6. CONCLUSION

The present study investigates the influence of liquidity generation and equity requirements on bank’s failure risk by using a sample of emerging Asian economies for 2004-2017. We employ the Arellano & Bond (1991) panel data, two-step dynamic GMM methodology, known as difference GMM and which uses the instruments in form of lags differences, to avoid the problem of endogeneity.

The regression results show a positive relation amid bank equity ratios and z-score, which implies that a rise in equity measure is likely to decrease in banking sector failure risk (as the higher z-score implies the reduced failure risk). The findings are consistent with the Von Thadden (2004) arguing that bank equity functions as a remedy against future losses and reduces the prospect of bank’s failure risk. The indirect impact of liquidity generation on the bank’s failure risk, through its interaction with a change in equity ratios, is negative and significant in the case of both the total

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capital and tier one capital ratios. The findings propose that with an incremental rise in bank equity ratio, the effect of liquidity creation on z-score is negative, which implies the increase in bank default risk. The finding validates the argument of Diamond & Rajan (2011), that liquidity generation function exposes the banking industry towards the risk of illiquidity.

In the case of bank internal control variables, profitability and bank size, both impact bank failure risk measure i.e. z-score positively. The results imply that a rise in profitability and bank size is expected to improve the z-score which results in the reduction of bank failure risk. In the case of macroeconomic indicators, the interest rate (i.e. monitory policy indicator) has a significant negative impact on z-score, implying the higher bank failure risk. The result suggests that an increase in interest rates reduces economic activity and hence increases the bank failure risk.

7. AVAILABILITY OF DATA AND MATERIAL

All relevant data are already included in this article.

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